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UNITED STATES DEPARTMENT OF AGRICULTURE

Weather Bureau
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CIRCULAR

INSTRUCTIONS FOR DAILY TRANSMISSION
OF AIRPLANE WEATHER OBSERVATIONS.

I. The following instructions will become effective January 1, 1935, and will supersede all those previously issued.

II. The reports of airplane weather observations will be transmitted in a numeral code by stations on the airway teletype circuit, or having Department of Commerce or Navy radio facilities. Stations not on teletype circuits or not having Department of Commerce or Navy radio facilities will telegraph their reports by word code to a designated station on the teletype circuit where they will be changed to the numeral code and placed on the circuit. Specific instructions will be issued by the Central Office, naming the designated stations referred to above.

III. The reports will be filed in time for transmission over the teletype circuit at the first "wheel" (airplane observation, APOB) schedule. Stations not on the teletype circuit, i. e., where the reports are transmitted by telegraph or radio to designated stations on the circuit, will transmit their reports in time for them to be placed on the teletype circuit at the first "wheel" schedule. The "wheel" schedule may be found on the National Teletype Communication Schedule, copies of which may be obtained from the Central Office.

Stations which have been authorized to make the observations regularly later than 5:30 a. m., E. S. T., i. e., too late for the reports to be filed at the first "wheel" schedule, will file them at the earliest possible time for transmission in "D & W" schedules.

IV. If, for any reason, more than one observation is made on the same day or the regular observation is made too late to file the report by the scheduled time, such records will be computed and the reports filed for transmission as promptly as possible. However, at Army fields, where only one Weather Bureau man is assigned, it is not intended that he remain long after hours in order to compute extra or delayed observations. In no case will a report be filed later than the day following that of the observation (E. S. T.).

V. At stations where the reports are regularly filed in numeral code before 8:30 a. m., E. S. T., when no observation has been made or the report is not ready to file by that time, a message will be filed giving the reason, e. g., "OH8/no APOB dense fog" or "delayed", etc. At stations where the reports are filed in numeral code and which have been authorized to make the observations regularly later than 5:30 a. m., E. S. T., a report will be filed as indicated in the preceding sentence, whenever no observation has been made or the report is not ready to file by the time at which the messages are regularly filed at the station.

When observations are delayed or missed at stations where the reports are telegraphed in the word code, messages as indicated above will not be filed, but the points on the circuit where such telegraphed reports are converted to numeral code and placed on the teletype, will file a "no APOB" message, omitting the reason for no observation. The call letters in such cases will be those of the airplane weather observation station.

Whenever it is found that erroneous data were transmitted, a correction should be filed immediately. Corrections should not be filed later than the day (E.S.T.) of the observation and should be no longer than necessary to make the report clear. In order to avoid sending corrections, the original messages should always be carefully checked before filing.

VI. Data will be transmitted only when the record extends to an elevation of 1000 meters, or more, above ground.

VII. Stations which file reports in the numeral code will, as promptly as practicable, after each Saturday observation, mail to the Central Office in an envelope marked "Airplane observation reports for Map Room", a copy of the reports for the week ending on Saturday. Prior to mailing, the messages should be carefully checked with the computed data and any changes due to corrections, or otherwise, should be clearly indicated, together with the reports as originally filed.

Stations which telegraph reports in the word code to stations with teletype facilities for retransmission in the numeral code will, as soon as practicable after the Saturday observation, mail to those stations, a carbon copy of the code telegraph messages for the week ending on Saturday. Prior to mailing, the messages should be carefully checked with the computed data and any changes due to corrections, or otherwise, should be clearly indicated by crossing out the erroneous word and entering the correct word above it. The stations with teletype facilities which receive these mailed copies of telegraphed code messages will decode them and carefully compare these with the corresponding numeral code messages which they originally transferred to the teletype in order to check against errors which might have been made in converting from the word to the numeral code or errors in telegraphic transmission. The original teletype messages should be typed on a sheet of paper and any changes due to corrections, or otherwise, should be clearly indicated in ink so that the corrections can be readily entered on the maps at the Central Office. These copied teletype data (not the data in word code) for each week ending on Saturday will be mailed by the stations on the teletype circuits as promptly as practicable to the Central Office in an envelope marked "Airplane observation reports for Map Room."

VIII. The "significant levels", i. e., points of change in vertical temperature or humidity gradients, will be transmitted. However, when "levels" show several surfaces of discontinuity less than 200 meters apart from one another, with small differences in both vertical temperature and humidity gradients for the intervening layers, only the lowermost and uppermost surfaces of discontinuity should be transmitted. Careful judgment must be exercised in individual cases in this matter, keeping in mind the necessity for reporting the significant discontinuities.

The distance between any two levels transmitted should not be greater than 2000 meters, even though the vertical temperature and humidity gradients are constant.

IX. NUMERAL CODE FOR USE IN TRANSMISSION BY TELETYPE OR RADIO.

(a) The data listed hereunder will be transmitted in the following units:

- (1) Elevations (including those of clouds and other phenomena referred to below) in tens of meters (dekameters) above sea level, e.g., 527 meters will be transmitted as 53; 1632, as 163; 4775, as 478, etc.
- (2) Barometric pressure, to nearest whole millibar.
- (3) Temperature, to nearest whole Centigrade degree.
- (4) Relative humidity, to nearest whole percent.

(b) The data in the reports will be transmitted in the following order:

- (1) Station designation, see par. IX(d) (1).
- (2) Time (followed by letter "Y" when reports are filed the day following that of the observation, E. S. T.) see pars. IV and IX(d) (2);
- (3) Surface data (barometric pressure, temperature and relative humidity) see par. IX(d) (3) (4) and (5);
- (4) Data for successive significant levels (elevation, barometric pressure, temperature and relative humidity) see par. IX(d) (6) (7) (8) (9) and (10);
- (5) Clouds (amount, type, direction, elevation of lower and upper limits if entered) see par. IX(d) (11);
- (6) Precipitation (kind, elevation of lower and upper limits if encountered) see par. IX(d) (12);
- (7) Thunderstorm, see par. IX(d) (13);
- (8) Ice formation (type, elevation of lower and upper limits) see par. IX(d) (14);
- (9) Smoke or haze (and elevation of upper limits) see par. IX(d) (15);
- (10) Fog (type and elevation of upper limit) see par. IX(d) (16);
- (11) Turbulence (and elevation of lower and upper limits) see par. IX(d) (17).

(c) Oblique lines will be used to separate the data for the respective levels and spaces used to separate the individual elements for each level, see par. IX(h).

(d) The following instructions will govern the transmission of the data listed under paragraph IX(b):.....

- (1) Station designation (teletype call letters).
- (2) Time of take-off to nearest hour, E. S. T., on 0-23 hour basis. When the report is filed on the day following that of the observation (E.S.T.), the time of take-off will be followed by the letter "Y" (denoting "yesterday").
- (3) Surface barometric pressure (corrected to elevation of instrument shelter) at time of take-off.
- (4) Surface temperature at time of take-off.
- (5) Surface relative humidity at time of take-off.
- (6) Elevation of first level.
- (7) Barometric pressure at first level.
- (8) Temperature at first level.
- (9) Relative humidity at first level.
- (10) Elevation of second level, followed by barometric pressure, temperature and relative humidity at second level. Thereafter will follow similarly the elevation of each successive significant level, together with the corresponding barometric pressure, temperature and relative humidity.
- (11) Clouds (amount, type and direction from which they are moving) observed at the time of take-off and those not visible from the ground but observed by the pilot during the ascent. Clouds observed by both the ground observer and the pilot will be reconciled before coding.

More than ten-tenths clouds may be sent when the pilot observes clouds which are not visible from the ground. For example, if the ground observer records 8 St. Cu. and 2 A. St. and the pilot observes that the 2 A. St. are part of an overcast A. St. layer above the St. Cu., the message will indicate 10 A. St. and 8 St. Cu.

In general, not more than four types of clouds should be reported in any one message and these should be the types of which there are the greatest amount present, except that the lower, intermediate and upper cloud groups should be represented whenever possible, particular effort being made to include two predominant layers of lower clouds when present.

The higher clouds will precede the lower in the message.

The letter "Z" will be used to indicate no cloud movement and the letter "U" will indicate direction unknown.

The elevation of the lower and upper limits at which the airplane enters and emerges from clouds, will be given in that order following the direction indicated for the respective clouds. These elevations will be preceded by distinguishing letters in certain cases to indicate the nature of the lower and upper cloud limits as outlined below:

Lower limit

When airplane enters base of cloud, use no distinguishing letter.

When airplane enters side of cloud, use "S".

When airplane enters cloud but unknown whether it is base or side, use "U".

When airplane is already in cloud and the pilot was not aware of entering it, use "N", followed by elevation at which the pilot first notices that he is in cloud.

Upper limit

When airplane emerges from top of cloud, use no distinguishing letter.

When airplane emerges from side of cloud, use "S".

When airplane emerges from cloud, but unknown whether it is top or side, use "U".

When airplane has emerged from cloud and the pilot was not aware of leaving it, use "N", followed by the elevation at which the pilot first notices that he has emerged from cloud.

When airplane continues in cloud to maximum elevation and does not emerge at a point higher than that at which it entered, use "C" followed by the maximum elevation reached.

It will be noted from the above rules that two elevations will always be given for each cloud entered.

Special care must be taken so as not to confuse sides of clouds with bases or tops.

Cloud elevations will be reported only when the cloud is actually entered by the airplane.

- (12) The form of precipitation encountered by the airplane will be indicated by the appropriate word, e. g., RAIN, MIST, SNOW, etc. The elevation of the lower and upper limits at which the airplane encountered and emerged from precipitation will be given in that order following the precipitation word. These elevations will be preceded by the same distinguishing letters used for clouds (see par. IX(d) (11)), to indicate the nature of the lower and upper precipitation limits. Thus, in accordance therewith, when precipitation is occurring at the ground, the elevation indicated for the lower limit will be the station elevation.

Precipitation will be reported only when the airplane actually enters a region within which precipitation is occurring.

- (13) Whenever during the flight, thunder is heard, the word "THUNDER" will be included. When lightning is seen and no thunder heard, the word "LIGHTNING" will be included. When thunder accompanies lightning, only the word, "THUNDER" will be included.
- (14) Whenever ice forms on the airplane, the type of deposit will be indicated by transmitting whichever of the following three words is appropriate:

(A) "ICE" (to represent transparent hard ice,
translucent hard ice or opaque hard ice).

(B) "RIME"

(C) "FROST"

If more than one of the above types form, preference will be given in the order (A), (B), (C), i. e., only one "ice" word will be sent.

When the elevations of the lower and upper limits at which the formation occurred are known they will be given in that order following the "ice" word. If either of these elevations is unknown, it will be omitted. When only the lower limit is known, the elevation will be given without identification; when only the upper limit is known, the elevation will be preceded by the letter "T" (denoting "TOP"). When both the lower and upper limits are known, no distinguishing letters will be used.

- (15) Whenever a "smoky", "thick smoke", "hazy" or "thick haze" condition, excluding local city smoke, prevails, the word "SMOKE" or "HAZE", or both, will be included. The elevation of the lower and upper limits of such conditions will be reported, except that when the lower limit is at the ground, no elevation will be reported for the lower limit. In such cases the elevation of the upper limit will be preceded by

the letter "T". When the airplane continues in the smoke or haze layer to the maximum elevation reached, the latter elevation will be reported, preceded by the letter "C".

(16) The words "MODERATE FOG" or "DENSE FOG", followed by the elevation of the top of the fog layer will be included whenever these conditions prevail, except that "ground fog" as defined on Weather Bureau Form No. 1133 or Weather Bureau Circular N. will not be reported. When the airplane continues in the fog layer to the maximum elevation reached, the latter elevation will be reported, preceded by the letter "C".

(17) The word "TURBULENCE", followed by the elevation of the lower and upper limits of the turbulent layer, or layers, encountered, as indicated by "bumpiness" or vertical air currents, will be reported whenever these conditions are pronounced.

(e) Standard abbreviations used on the airway teletype and radio circuits for meteorological terms will be used in these reports.

(f) The Department of Commerce will add the filing time (local standard) and date at the end of each of these reports sent over the communication systems of that Department.

(g) The distribution of these reports over the teletype circuits will be handled by the Department of Commerce upon recommendation of the Central Office.

(h) Following is a sample message in the numeral code:

OH5/986 11 85/70 934 16 58/135 865 12 58/221 780 7 78/266 738 9 60/
360 658 0.85/392 630 -2 95/495 555 -7 98/7AST→392 C495/1STCU✓/
SNW 360 C495/RIME T495/H T221/TURBC 266 392

The above will be decoded as follows:

OH5/	Omaha, Nebr., hour of take-off, five A. M., E. S. T.;
986 11 85/	986 mb., barometric pressure,)at surface at 11°C., temperature,)time of take- 85% relative humidity;)off
70 934 16 58/	700 meters elevation above) sea level,)att first 934 mb., barometric pressure,)level 16°C., temperature,) 58%, relative humidity;)
135 865 12 58/	1350 meters elevation above) sea level,) 865 mb., barometric pressure,)at second 12°C., temperature,)level 58%, relative humidity;)

221 780 7 78/	2210 meters elevation above) sea level,) 780 mb., barometric pressure,)at third 7°C., temperature,)level 78%, relative humidity;)
266 738 9 60/	2660 meters elevation above) sea level,) 738 mb., barometric pressure,)at fourth 9°C., temperature,)level 60%, relative humidity;)
360 658 0 85/	3600 meters elevation above) sea level,) 658 mb., barometric pressure,)at fifth 0°C., temperature,)level 85%, relative humidity;)
392 630 -2 95/	3920 meters elevation above) sea level,) 630 mb., barometric pressure,)at sixth -2°C., temperature,)level 95%, relative humidity;)
495 555 -7 98/	4950 meters elevation above) sea level,) 555 mb., barometric pressure,)at seventh -7°C., temperature,)level 98%, relative humidity;)
7AST->392 C495/	Seven tenths Alto Stratus, moving from the west; base 3920 meters above sea level, continued in cloud at maximum elevation, 4950 meters above sea level;
1STCU →/	One tenth Strato Cumulus, moving from the southwest;
SNW 360 C495	Snowing, lower limit of encountering snow, 3600 meters, continued in snow at maximum elevation, 4950 meters above sea level;
RIME T495/	Rime formed on airplane, elevation of lower limit unknown, upper limit 4950 meters above sea level;
H T221/	Haze at ground level elevation of upper limit, 2210 meters above sea level;
TURBC 266 392	Turbulence encountered by airplane, elevation of lower limit 2660 meters, upper limit 3920 meters above sea level.

X. WORD CODE FOR USE IN TRANSMISSION BY TELEGRAPH:

(a) The same units and data will be transmitted by telegraph as by teletype and radio (par. IX(a) and (b)), except that the station designation is omitted in certain cases as explained in par. X(b), and except that only even figures will be sent in certain cases as indicated in par. X(c) (2), (3) and (4).

(b) The sequence of words to be used in the body of the message will be as listed in par. X(c), unless either or both of the following exceptions apply:

(1) When the place of observation is not identical with the place of filing the message, the first word as indicated in par. X(c) (1) will be preceded by the observation station designation. (The arrangement of the words indicated under par. X(c) omits the station designation since the arrangement applies to cases where the place of observation is identical with the place of filing the message. In such cases it is possible to ascertain the place of observation since the place of filing is always given by the telegraph company aside from the body of the telegram.)

(2) When a report is filed on the day following that of the observation (E. S. T.), the first word as indicated in par. X(c) (1) will be followed by the word "YESTERDAY". (The arrangement of the words indicated under par. X(c) omits reference to the date since the arrangement applies to cases where the date of observation is the same as the date on which the message is filed. In such cases, it is possible to ascertain the date of observation since the date of filing is always given by the telegraph company aside from the body of the telegram.)

(c) The following instructions will govern the transmission of data referred to in par. X(a), subject to the exceptions given in par. X(b).

(1) The first word in the message will indicate the time of take-off, to nearest hour, E. S. T., on 0-23 hour basis.

Examples:

5 a. m., (FIVE); 2 p. m., (FOURTEEN).

(2) The second word in the message will indicate the surface barometric pressure (corrected to elevation of instrument shelter) at time of take-off, to the nearest even millibar. This word will be taken from the "Pressure-Temperature" words, pp. 19-28, Weather Code 1931, using always the first column on the page. When the value is exactly halfway between two even numbers, the smaller even number will be used.

The units and tens place digits will be indicated by the second code element in the word and the hundreds place digits by the first letter in the word. The initial letter "U" indicates one unit of the thousands place and no hundreds place digit.

Examples:

986 (TURSIN); 879 (SURROGATE); 1022 (UNDAM).

(3) The third word in the message will indicate the surface temperature and relative humidity at time of the take-off. The same set of code words will be used as for pressure. The temperature will be indicated by the first code element in the word and the humidity by the second code element.

The decimal in the temperature figure will be dropped according to the standard Weather Bureau rule for disposing of decimals, e. g., 14.6° will be changed to 15°. This latter value will then be doubled (30°), thus making it possible to transmit odd values. Negative temperatures, likewise, will be doubled after disposing of the decimal, and the complement, i. e., 100 minus the value will then be coded as explained above.

Odd values of relative humidity will be changed to even in the same way as the pressure (see par. X(c) (2)). Humidities of 3%, or less, will be coded as 2%, and 100% will be coded as zero.

Examples:

14.6°, 49% (FULGOR)
11.3°, 1% (DACAPO)
22.6°, 100% (GIG)
- 4.5°, 89% (TARSOAP)
- 1.3°, 56% (TOMINA)
0.2°, 82% (USAGE)

(4) The fourth word in the message will indicate the elevation above sea level of the first level. The elevation expressed in even tens of meters will be enciphered using the same code words as for pressure (see par. X(c) (2)). If the elevation in tens of meters is odd, it will be converted to the next lower even value before enciphering. The tens and units place digits (of the elevation in tens of meters) will be indicated by the second code element in the word and the hundreds place digit by the first letter in the word.

Examples:

260 meters (UNDID); 1010 meters (BULK);
2260 meters (DUDISH); 4000 meters (GUY)

(5) The fifth and sixth words in the message will indicate the barometric pressure (see par. X(c) (2)), and temperature-relative humidity (see par. X(c) (3)), respectively, at the elevation indicated by the fourth word. These words will be followed in the same sequence, by words indicating the elevation above sea level of the remaining levels and the corresponding barometric pressures, temperatures and relative humidities.

(6) Clouds (amount, type and direction from which they are moving) observed at the time of take-off and those not visible from the ground but observed by the pilot during the ascent, will next be indicated by code words taken from Weather Code (1931), pp. 59 and 60, except that the words for "calm" and "unknown direction" will be taken from the Appendix attached hereto. In accordance with par. IX(d) (11), clouds observed by both the ground observer and the pilot will first be reconciled and a total of more than ten-tenths may be sent.

In general, not more than four types of clouds should be reported in any one message and these should be the types of which there are the greatest amount present, except that the lower, intermediate and upper cloud groups should be represented whenever possible, particular effort being made to include two predominant layers of lower clouds when present.

The higher clouds will precede the lower in the message.

The elevation of the lower and upper limits at which the airplane enters and emerges from clouds, will be given in that order following the respective cloud code words. These elevations will be enciphered in accordance with instructions given in par. X(c) (4). The code words for these elevations will be preceded by distinguishing words in certain cases to indicate the nature of the lower and upper cloud limits as outlined below:

Lower limit

When airplane enters base of cloud, use no distinguishing word.

When airplane enters side of clouds, use "SIDE".

When airplane enters cloud but unknown whether it is base or side, use "UNKNOWN".

When airplane is already in cloud and the pilot was not aware of entering it, use "NOTICED", followed by elevation at which the pilot first notices that he is in cloud.

Upper limit

When airplane emerges from top of cloud, use no distinguishing word.

When airplane emerges from side of cloud, use "SIDE".

When airplane emerges from cloud but unknown whether it is top or side, use "UNKNOWN".

When airplane has emerged from cloud and the pilot was not aware of leaving it, use "NOTICED", followed by the elevation at which the pilot first notices that he has emerged from cloud.

When airplane continues in cloud to the maximum elevation and does not emerge at a point higher than that at which it entered, use "CONTINUED", followed by the code word for the maximum elevation reached.

It will be noticed from the above rules that two elevations will always be given for each cloud entered.

Special care must be taken so as not to confuse sides of clouds with bases or tops.

Cloud elevations will be reported only when the cloud is actually entered by the airplane.

(7) The form of precipitation encountered by the airplane will be indicated by the appropriate word, e. g., RAIN, MIST, SNOW, etc. The elevation of the lower and upper limits at which the airplane encountered and emerged from precipitation will be given in that order following the precipitation word. These elevations will be enciphered in accordance with instructions given in par. X(c) (4). These elevations will be preceded by the same distinguishing words used for clouds (see par. X(c) (6)), to indicate the nature of the lower and upper precipitation limits. Thus, in accordance therewith, when precipitation is occurring at the ground, the elevation indicated for the lower limit will be the station elevation.

Precipitation will be reported only when the airplane actually enters a region within which precipitation is occurring.

(8) Whenever, during the flight, thunder is heard, the word "THUNDER" will be included. When lightning is seen and no thunder heard, the word "LIGHTNING" will be included. When thunder accompanies lightning, only the word "THUNDER" will be included.

(9) Ice formation on the airplane will be reported in accordance with par. IX(d) (14), except that when only the upper limit of the ice formation is known, the elevation code word will be preceded by the word "TOP". Elevations will be enciphered in accordance with instructions given in par. X(c) (4).

(10) Smoke or haze will be reported in accordance with par. IX(d) (15), except that when the elevation of only the upper limit is reported, it will be preceded by the word "TOP" and when the airplane continues in the layer to the maximum elevation reached, the latter elevation will be preceded by the word "CONTINUED". Elevations will be enciphered in accordance with par. X(c) (4).

(11) Fog will be reported in accordance with par. IX(d) (16), except that when the airplane continues in the fog layer to the maximum elevation reached, the latter elevation will be preceded by the word "CONTINUED". Elevations will be enciphered in accordance with par. X(c) (4).

(12) Turbulence will be reported in accordance with par.
IX(d) (17). Elevations will be enciphered in accordance with
par. X(c) (4).

(d) Following is a sample message in the word code: FIVE TURSIN DAMSEL
UNRULY TURFED FAMOUS BUFFETING SUMNER DEMOCRAT DUMDUM RUMSY BEROBE DUNNISH
RUMFORD BONNY FURNUT NUMOIL UPSET FUSTARO NYFUS TIGHTEN GUNTER MUSKMELON
SINTON CENTRIST FUSTARO CONTINUED GUNTER CONNUBIAL SNOW FURNUT CONTINUED
GUNTER RIME TOP GUNTER HAZE TOP DUMDUM TURBULENCE DUNNISH FUSTARO.

The above will be decoded as follows:

FIVE	Hour of take-off, 5 A. M., E. S. T.
TURSIN DAMSEL	986 mb., barometric pressure,)at surface 11°C., temperature,)at time 84%, relative humidity;)of take-off
UNRULY TURFED FAMOUS	700 meters elevation above sea level,) 934 mb., barometric pressure,)at first level 16°C., temperature, 58% relative) humidity;)
BUFFETING SUMNER DEMOCRAT	1340 meters elevation above sea level,) 864 mb., barometric pressure,)at second level 12°C., temperature, 58% relative) humidity;)
DUMDUM RUMSY BEROBE	2200 meters elevation above sea level,) 780 mb., barometric pressure,)at third level 7°C., temperature, 78% relative) humidity;)
DUNNISH RUMFORD BONNY	2660 meters elevation above sea level,) 738 mb., barometric pressure,)at fourth level 9°C., temperature, 60% relative) humidity;)
FURNUT NUMOIL UPSET	3600 meters elevation above sea level,) 658 mb., barometric pressure,)at fifth level 0°C., temperature, 84% relative) humidity;)
FUSTARO NYFUS TIGHTEN	3920 meters elevation above sea level,) 630 mb., barometric pressure,)at sixth level -2°C., temperature, 94% relative) humidity;)
GUNTER MUSKMELON SINTON	4940 meters elevation above sea level,) 554 mb., barometric pressure,)at seventh level -7°C., temperature, 98% relative) humidity;)
CENTRIST FUSTARO CONTINUED GUNTER	6/10 or 7/10 Alto Stratus moving from the west; Base 3920 meters above sea level; Continued in cloud at maximum elevation, 4940 meters above sea level;

CONNUBIAL	1/10 Strato Cumulus, moving from the southwest;
SNOW	Snowing;
FURNUT	Lower limit of encountering snow, 3600 meters,
CONTINUED GUNTER	Continued in snow at maximum elevation, 4940 meters above sea level;
RIME	Rime formed on airplane, elevation of lower limit unknown;
TOP GUNTER	Elevation of upper limit, 4940 meters above sea level;
HAZE	Haze at ground level;
TOP DUMDUM	Elevation of upper limit, 2200 meters above sea level;
TURBULENCE	Turbulence encountered by airplane;
DUNNISH	Elevation of lower limit, 2660 meters;
FUSTARO	Elevation of upper limit, 3920 meters above sea level.

W. R. Gregg,
Chief of Bureau.

APPENDIX

Cloud code words for "Calm" and "Unknown Direction" for use in telegraphic reports.
 (See paragraph X (c) (6)).

CALM.

Cloud Type.	1/10 or less.	2 or 3 tenths	4 or 5 tenths	6 or 7 tenths	8, 9, or 10 tenths
Ci or Ci St	Cull	Curval	Curley	Cupid	Cuckoo
Ci Cu or A Cu	Catch	Calvar	Cake	Caking	Callow
A St.	Cent	Cellar	Celeste	Ceiling	Cesspool
Cu	Circum	Cicala	Cicero	Cilium	Cinco
St Cu	Cocky	Collar	Copper	Coppice	Coco
St	Chilly	Choppage	Chopper	Choking	Chico
Nb or Cu Nb.	Clanky	Clovak	Clapper	Cracking	Crimpole
UNKNOWN.					
Ci or Ci St.	Cuzzy	Cuzald	Cuzel	Cuzilt	Cuzolp
Ci Cu or A Cu.	Cazy	Caizan	Cazell	Cazif	Cazole
A St.	Cezule	Cezave	Cezery	Cezist	Cezode
Cu.	Cirzule	Cizaln	Cilzer	Cipzil	Cilzor
St. Cu.	Cozup	Cozate	Cozener	Cozine	Cozorp
St.	Chozy	Chizam	Chazel	Chezipe	Chazop
Nb or Cu Nb.	Clazule	Clazart	Crazed	Clezir	Crazol

